We claim:

1. A method of fabricating a spatial light modulator, comprising:

forming a first substrate defining a cavity;

fabricating an electrode on a second substrate;

bonding the first substrate to the second substrate; and

forming a hinge and mirror plate on the first substrate; and

applying a reflective surface on a mirror plate and above a portion of the hinge, the reflective surface having an area greater than an area of the upper surface of the mirror plate.

2. The method of claim 1, wherein the reflective surface substantially conceals the hinge associated with the mirror plate.

3. The method of claim 1, wherein the hinge is formed substantially beneath an upper surface of the mirror plate and is substantially concealed by the reflective surface.

4. The method of claim 1, wherein the first substrate in the spatial light modulator is a single piece of material.

5. The method of claim 1, wherein the first substrate in the spatial light modulator is single crystal silicon.

6. The method of claim 1, further comprising forming a motion stop on a lower surface of the mirror plate.

7. The method of claim 6, further comprising forming a landing tip on the second substrate at a position to receive the motion stop.

8. The method of claim 1 further comprising, prior to bonding the first substrate to the second substrate, fabricating addressing and control circuitry on the second substrate.

9. The method of claim 1 wherein a center height of the hinge is substantially coplanar with a center height of the mirror plate.

10. The method of claim 1 wherein the cavity is bounded by spacer support walls on a spacer support frame in the first substrate.

11. The method of claim 1 wherein the circuitry is formed using CMOS techniques.

12. The method of claim 1 wherein forming a first substrate defining a cavity comprises:

obtaining the first substrate having a device layer of pre-determined thickness;

depositing a dielectric material on the device layer of the first substrate;

etching the dielectric material to create an opening at a pre-determined location;

growing in the opening a material having the same crystal structure as the device layer; and

removing the dielectric layer.

13. The method of claim 12, wherein the device layer is a single crystal silicon material and wherein the first substrate includes an insulating oxide layer on the device layer and a handling substrate on the insulating oxide layer.

14. The method of claim 12, wherein the device layer has a thickness of between 0.2 microns and 0.4 microns.

15. The method of claim 12, wherein the dielectric material is silicon oxide.

16. The method of claim 12, wherein the material grown in the opening is grown by an epitaxial growth process.

17. The method of claim 1, wherein forming a first substrate defining a cavity comprises:

putting a mask onto the first substrate, the mask having a first portion defining a location of the cavity, the first portion exposing the first substrate underneath the first portion to be etched, and a second portion defining locations of support walls that define the cavity, the second

portion capable of preventing the first substrate underneath the second portion from being etched;

etching the first substrate beneath the first portion of the mask to a pre-determined depth; and

removing the mask from the substrate.

18. The method of claim 1, wherein fabricating an electrode on a second substrate comprises:

covering a control circuitry with a passivation layer;

depositing a metallization layer on the passivation layer;

patterning the metallization layer in a pattern that will define the electrode; and

etching the metallization layer to leave behind the material that makes up the electrode.

19. The method of claim 1, wherein bonding the first substrate to the second substrate comprises:

aligning the first substrate relative to the second substrate so that the electrode on the second substrate is in a position to control deflection of an associated micro mirror in the first substrate; and

bonding the first substrate and the second substrate using a low temperature bonding method.

20. The method of claim 1, wherein forming a hinge and a mirror plate on the first substrate comprises:

thinning a top layer of the first substrate to a pre-determined thickness;

etching the hinge on the first substrate substantially beneath an upper surface of the thinned first substrate;

depositing a sacrificial layer onto the first substrate;

planarizing the first substrate to remove the sacrificial layer from the upper surface of the first substrate;

releasing the mirror plate by etching the first substrate; and

removing the sacrificial layer on and around the hinge so the mirror plate can rotate about an axis defined by the hinge.

21. The method of claim 20, wherein thinning a top layer of the first substrate to a pre-determined thickness comprises:

removing a handling substrate in the first substrate by grinding and/or etching; and

stripping away an insulating oxide layer in the first substrate.

22. The method of claim 20, wherein etching the hinge on the first substrate substantially beneath an upper surface of the thinned first substrate comprises:

etching a recess in the upper surface of the first substrate; and

etching the first substrate to release the hinge from the first substrate, keeping an end of the hinge connected to the first substrate.

23. The method of claim 20, wherein depositing a sacrificial layer onto the first substrate comprises:

filling a gap on and around the hinge with the sacrificial layer; and

depositing the sacrificial layer on the upper surface of the first substrate.

24. The method of claim 20, wherein planarizing the first substrate to remove the sacrificial layer comprises using an etch back step or a chemical mechanical processing process to remove the sacrificial layer.

25. The method of claim 20, wherein removing the sacrificial layer on and around the hinge comprises using a plasma etch process.

26. The method of claim 1, wherein applying a reflective surface on a mirror plate and above a portion of the hinge comprises:

depositing aluminum on an upper surface of the first substrate; and

depositing aluminum above a portion of the hinge, wherein the aluminum has a thickness of 300A or less.

27. A method of fabricating a plurality of mirrors for a spatial light modulator, comprising:

forming a cavity in a first side of a first substrate;

thinning a top layer on a second side of the first substrate to a predetermined thickness;

etching a hinge on the second side of the first substrate substantially beneath an upper surface of the thinned first substrate;

depositing a sacrificial layer on the second side of the first substrate;

planarizing the second side of the first substrate;

depositing a reflective surface on the second side of the first substrate;

releasing a mirror by etching;

removing the sacrificial layer on and around the hinge so the mirror can rotate about an axis defined by the hinge.

28. The method of fabricating a plurality of mirrors for a spatial light modulator of claim 27, wherein the reflective surface substantially conceals the hinge.

29. The method of fabricating a plurality of mirrors for a spatial light modulator of claim 27, wherein the reflective surface is deposited on the upper surface of the first substrate and above a portion of the hinge, the reflective surface having an area greater than an area of the upper surface of the mirror plate.

30. The method of claim 27, wherein forming a cavity in a first side of a first substrate comprises:

generating a mask defining an area to be etched from the first side of the first substrate;

removing material in the area on the first side of the first substrate defined by the mask, to form the cavity in the first side of the first substrate.

31. The method of claim 27, wherein forming a cavity in a first side of a first substrate comprises:

obtaining the first substrate having a device layer of pre-determined thickness;

depositing a dielectric material on the device layer of the first substrate;

etching the dielectric material to create an opening at a location of a support wall of a spacer support frame to be created;

growing in the opening a material having the same crystal structure as the device layer; and

removing the dielectric layer.

32. The method of claim 31, wherein the first substrate further has an insulating oxide layer on the device layer and a handling substrate on the insulating oxide layer, and wherein the device layer has a thickness of between about 2 microns and about 3 microns.

33. The method of claim 30, wherein removing material in the area of the first substrate defined by the mask comprises etching the first substrate.

34. The method of claim 30, wherein removing material in the area of the first substrate defined by the mask comprises performing an anisotropic reactive ion etch with SF6, HBr, and oxygen gases flowing.

35. The method of claim 27, wherein thinning a top layer of the second side of the first substrate comprises:

removing the handling substrate by grinding and/or etching; and

stripping the oxide layer.

36. The method of claim 27, wherein thinning a top layer of the second side of the first substrate comprises a process selected from the group consisting of grinding, silicon back etching, wet etching, and plasma etching.

37. The method of claim 27 wherein etching a hinge includes a first etch into the upper surface on the second side of the first substrate to form a recess below the upper surface, and a second etch to release the hinge from a mirror plate portion of the first substrate.

38. The method of claim 27 further comprising etching a motion stop on a lower surface of the mirror plate in the first substrate.

39. A method of fabricating a spatial light modulator including an array of a plurality of mirrors, comprising:

generating a mask defining areas to be etched from a first side of a first substrate;

etching the areas on the first side of the first substrate defined by the mask to form a plurality of cavities in the first side of the first substrate;

fabricating electrodes on a first side of a second substrate;

bonding the first side of the first substrate to the first side of the second substrate;

thinning a top layer on the second side of the first substrate to a predetermined thickness;

etching a hinge in the first substrate;

depositing a sacrificial layer on the first substrate;

planarizing the first substrate to remove the sacrificial layer from an upper surface on the second side of the first substrate, leaving sacrificial material on and around the hinge;

depositing a reflective surface on the upper surface and above a portion of the hinge;

releasing a mirror by etching;

removing the remaining sacrificial layer from the first substrate so the mirror can rotate about an axis defined by the hinge.

40. The method of fabricating a spatial light modulator of claim 39, wherein the reflective surface having an area greater than an area of the upper surface of the mirror plate.

41. The method of fabricating a spatial light modulator of claim 39, wherein the reflective surface substantially conceals the hinge.

42. The method of fabricating a spatial light modulator of claim 39, wherein the hinge is formed substantially beneath an upper surface of the first substrate and is substantially concealed by the reflective surface.

43. The method of claim 39, wherein etching the areas on the first side of the first substrate defined by the mask to form a plurality of cavities in the first side of the first substrate comprises performing an anisotropic reactive ion etch with SF6, HBr, and oxygen gases flowing.

44. The method of claim 39, further comprising, prior to fabricating electrodes on the first side of the second substrate, forming control circuitry on the first side of the second substrate.

45. The method of claim 44, wherein forming control circuitry on the first side of the second substrate comprises fabricating a memory buffer, a display controller and a pulse width modulation array.

46. The method of claim 39, wherein fabricating electrodes on the first side of the second substrate comprises:

covering the fabricated control circuitry with a passivation layer;

depositing a metallization layer on the passivation layer;

patterning the metallization layer in a pattern that will define the electrodes; and

etching the metallization layer to leave behind the material that makes up the electrodes.

47. The method of claim 39 further comprising, prior to bonding the first side of the first substrate to the first side of the second substrate, aligning the first substrate with the second substrate so that the electrodes on the second substrate are positioned to control the deflection of mirrors in the first substrate when the first and second substrates are bonded together.

48. The method of claim 47, wherein aligning the first substrate with the second substrate comprises aligning a pattern on the first substrate with a pattern on the second substrate.

49. The method of claim 39, wherein bonding the first side of the first substrate to the first side of the second substrate comprises using a low temperature bonding method performed at less than approximately 400 degrees Celsius.

50. The method of claim 39 wherein etching the hinge includes a first etch into the upper surface of the first substrate to form a recess below the upper surface, and a second etch to release the hinge from a mirror plate portion of the first substrate.

51. The method of claim 39 further comprising etching a motion stop on a lower surface of the mirror and wherein the reflective surface is deposited on the upper surface of the first substrate and above a portion of the hinge.

52. A method of operating a spatial light modulator, comprising:

selecting a micro mirror to deflect in a micro mirror array of the spatial light modulator; and

applying a voltage differential between the selected micro mirror and an electrode associated with the selected micro mirror causing the micro mirror to deflect, the micro mirror having a reflective surface to substantially conceal a hinge and to deflect light incident upon the micro mirror.